

A NEW AGAVE FROM ARIZONA

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With two plates

ON MAY 15, 1934, while visiting the Kaibab Plateau on the northern side of the Grand Canyon of the Colorado, Coconino County, Arizona, the writer first saw the *Agave* here described. Two plants had been collected by the Park authorities at some previous date, but their leaf-rosettes and long fruiting stalks were still intact. It was not possible to make the descent into the gorge, but a few scattered plants were discernible some distance below the rim. Flowers were promised at a later date but were never forthcoming, unfortunately.

The two plants are shown in the included photograph (McKelvey 152-12); although one was considerably smaller than the other it was undoubtedly the same species. The dimensions are from the larger plant.

Agave kaibabensis, spec. nov.

A *A. utahense* differt habitu solitario, non caespitoso; foliis basi rosulatis confertis, longioribus, latioribus; inflorescentiis elongatis (4.4-7.5 m. longis), basi ramiferis.

Leaf-rosette 1.4 m. in breadth, 0.7 m. in height, nearly hemispherical, with ascending and spreading straight leaves which attained 0.4 m. in length (base included). Leaf-blade concavo-convex for the entire length, usually tapered from the point of union with the base to the apex, sometimes constricted above this union, then gradually and slightly broadened to a point near the middle, thence tapered to an acuminate apex, smooth on both surfaces; terminal spine 1-1.3 cm. in length, channeled on the upper surface and decurrent along the margins of the blade for 10-15 cm.; prickles along the leaf-margins irregularly spaced at intervals of 0.7-2 cm., small, 1.6-3.2 mm. in length, curving either backward or forward following the blade-margins. Leaf-base about 15 cm. in breadth at the point of union with the stem, gradually narrowed to the point of union with the blade where about 6.5 cm. in breadth, about 10 cm. in median length. Inflorescence 4.4 m. in length over all; scape 1.4 m., inflorescence proper ca. 3 m.; the last, while spicate in general appearance, was narrowly ovoid-cylindrical, branched for the entire length, the branchlets longer and more complexly branched below than above; branchlets near the base 10-12 cm. in length, twice forked; those above gradually reduced in length and finally at the top of the inflorescence proper simple. Capsules produced in great numbers, 2.5-3 cm. in length, nearly ovoid with an acute apex and short-stipitate base, with slightly glossy, red-brown epidermis; pedicels attaining 0.7 cm. in length, enlarged at the point of union with the capsule, terete; seeds extremely abundant, small, black;

bracts near the base of the scape 18–20 cm. in length, only slightly reduced in length below the inflorescence proper, at insertion 2.5–3.8 cm. in breadth, tapered from this point to the apex, the upper portion more or less concave, the lower portion flat, with a short, very sharp, channelled red spine, tenaciously attached to the scape, eventually reflexed.

ARIZONA: Coconino County, Kaibab Plateau on the north side of the Grand Canyon of the Colorado River, *McKelvey 4381* (Arnold Arboretum, TYPE), *4381A* (Arnold Arboretum), May 15, 1934.

At first glance the plants were thought to be *Agave utahensis* Engelm., in colossal form — that species is common in northwestern Arizona and is said to occur plentifully in the Grand Canyon although the writer has not happened to see it growing there. But examination disclosed marked differences in the individual leaf, the leaf-rosette, to some extent in the inflorescence, and, important, in the habit of the plant.

When examined the leaves of the new species were dry and their margins were considerably incurled but must once have been much flatter; in form and size and in the straight, spreading habit they came close to what is found in the so-called century plant or mescal — with paniculate inflorescence — and the rosette in size and near-hemispherical form also. The leaves of *Agave utahensis* and of those of its allies with prickles along the leaf-margins (and producing spicate or subspicate inflorescences) show a marked tendency to bend inward towards the center of the head, producing a spherical or near-spherical rosette. This tendency to spreading or to curving inward is not altered with the death of the plant; if anything it becomes more pronounced with drying in each instance. The leaves are also much smaller, shorter, and narrower.

Agave utahensis shows a tendency towards a paniced inflorescence. This has been noted by the writer more than once and has been recorded in the literature. Miss Mulford (*Agaves of the United States*, 77, 1896) states that that species “. . . so frequently approaches the paniculate character, that it might be placed in the Euagave section with almost as much propriety as in that of the *Littaea*.” In the case of the new species the branching is more complex and not confined to the lower portion of the inflorescence proper as is usual in the better known plant.

In habit the two would seem to differ radically. The two plants of *Agave kaibabensis* which were examined showed no tendency to produce offsets, while those seen from afar in the gorge were obviously solitary rather than of clump-habit. *Agave utahensis* is caespitose, in all instances, often producing large and involved clumps.

Park officials said that near the base of the gorge flower-stalks attained 7.5 m. in over-all length; while easy to overestimate, yet, from the large specimen seen, a greater size does not seem improbable. It is not unique to find a plant growing on the walls of the gorge but not appearing above the rim — it has been observed in one species of *Yucca* certainly. It was said that the Piute Indians called the plant “Oose” (this spelling open to correction); the local name was “Yant,” the stalk of the inflorescence called a “Yant-stick” and used to prod cattle.

Unsuccessful attempts were made to locate the plant in adjacent regions, and while, from information obtained, it may occur near the lower portion of Kanab Creek where this empties into the Colorado, it is possible that the name "Yant" may be applied as well to *Agave utahensis*.

It is believed that photographs of *Agave kaibabensis* have appeared on three occasions: Once in an unsigned article in *Garden and Forest* (8: 384, fig. 53. 1895) as *Agave utahensis*; but the solitary rosette is far more suggestive in every respect of the plant under discussion. The short scape of the photograph would be abnormal for either species, — it may have been cut for inclusion, but one cannot be sure from the reproduction. The article notes the leaves as "... twelve or fourteen inches long and from two to three inches broad. . . ." and "... the slender spike . . . as three feet long, and often raised on a stem seven or eight feet high." This plant grew on "... the bluffs and cliffs which rise from the slopes of the Grand Cañon . . ." (while not entirely clear this seems to indicate the Canyon walls); it is not stated whether on the north or the south side of the river.

Next, two photographs appeared in Mr. Harold E. Anthony's interesting article published in *Natural History* (40: 719, 1937), describing the exploration of Shiva Temple, a near-island in the Canyon connected by a saddle with the north rim. The first photograph, showing only a rosette — one which might well belong in the Euagave section — is captioned: "The Mescal of Shiva is a variety of century plant with stiff, thorn-tipped foliage. The young plants grow in a compact clump." The word "clump" as used here probably refers to the dense rosette — it shows no tendency to suckering. The second photograph is captioned: "When mature the mescal, or 'yant,' sends up a tall flower stalk twelve feet or more. The Pueblo Indians used the starchy center of this stalk for food, baking it in earthen pots." The rosette is not visible in this picture, but one sees a tall inflorescence with scape longer than the flowering portion and with the inflorescence proper considerably broader below than above, although the general effect is spike-like.

The third picture of this plant has recently (1945) appeared in *This is the Place: Utah*, by Maurine Whipple. The caption is *The Grand Canyon of the Colorado*, the plate on page 204.

The name *Agave kaibabensis* indicates the plant's habitat as now known. The smaller plant of the picture is *McKelvey 4381A*. The plant, as noted, came originally from some distance below the rim on the north wall of the Canyon. The date of actual collection is not known; it must have been in the tourist season of 1933; the writer made her specimens on May 15, 1934. Her photographs 152-11, 12, and 153-1, 2 are of these plants; reproduced here is 153-2 (Pl. I).

Included, to show the different appearance of its rosettes and leaves, is a photograph (*McKelvey 82-1*) of *Agave utahensis* (Pl. II); the specimen (*McKelvey 1655*) was collected March 31, 1929, some 13 miles east of Peach Springs, Mohave County, Arizona, in the extreme northwestern corner of Yavapai County. Over much of this region the plant is plentiful, reaching certainly as far southwest as Valentine, Mohave County.

The tendency of the leaves to bend inward towards the center of the head and so form a near-spherical rosette, and the caespitose habit of the plant are apparent. The six-inch rule indicates the small size of leaf and leaf-cluster. Miss Mulford (l. c.) described the leaves of *Agave utahensis* as “. . . linear-lanceolate . . . 12 to 17 cm. long, 2–2.5 cm. wide, or larger . . .” and its inflorescence thus, “. . . scape 15 to 24 dm. high . . . upper 3 to 6 dm. floriferous; panicle narrow . . .”

EXPLANATION OF PLATES

PLATE I. *Agave kaibabensis* McKelvey, showing the near-hemispherical rosette of leaves and the long-branched inflorescence. Collected on the Kaibab Plateau, on the north side of the Grand Canyon of the Colorado River, Coconino County, Arizona.

PLATE II. *Agave utahensis* Engelm., showing caespitose habit. Collected about thirteen miles east of Peach Springs, Mohave County, Arizona.

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